



# UNITED STATES PATENT AND TRADEMARK OFFICE

07  
UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/758,426	01/16/2004	Chong-Ren Maa	MAA=2D	5651
1444	7590	06/24/2004		EXAMINER
BROWDY AND NEIMARK, P.L.L.C.				DINH, TUAN T
624 NINTH STREET, NW				
SUITE 300			ART UNIT	PAPER NUMBER
WASHINGTON, DC 20001-5303				2827

DATE MAILED: 06/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)
	10/758,426	MAA ET AL.
	Examiner Tuan T Dinh	Art Unit 2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on \_\_\_\_.
- 2a) This action is FINAL.                            2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_ is/are allowed.
- 6) Claim(s) 1-8 is/are rejected.
- 7) Claim(s) \_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:
  1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 06/16/04
- 4) Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: \_\_\_\_.

## **DETAILED ACTION**

### ***Specification***

1. The disclosure is objected to because of the following informalities:

Page 8, line 14, change "261of" to -261 of—for proper typo.

Appropriate correction is required.

### ***Drawings***

2. The drawings are objected to under 37 CFR 1.83(a) because they fail to show " a first area 404, a second area 406, and a tip 266" as described in the specification (specific in page 8, figure 6).

Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). Corrected drawing sheets are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency.

Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in

the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Objections***

3. Claims 1-2, 4, and 6-7 are objected to because of the following informalities:

Claim 1, line 11, "...to that of" should be –...to—for proper reading.

Claim 1, lines 12-13, please change "in such a way that" to –to form—for proper reading.

Claim 1, line 17, "...less than that of said first area" should be --...less than said first area--- for proper reading.

Claim 2, line 4, "and that of" should be –and—for proper reading.

Claim 4, line 3, "in such a way that" should be –to form—for proper reading.

Claim 4, lines 7-8, "less than that of said first area" should be –less than said first area—for proper reading.

Claim 6, line 3, "identical to that of..." should be –identical to...--- for proper reading.

Claim 7, lines 1-2, change "the average" to –an average—for proper antecedent basis.

Claim 8, lines 1-2, change "the micro-roughness" to –a micro-roughness—for proper antecedent basis.

Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1, 3-5, and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by Reed (U.S. Patent 4,211,603).

As to claims 1, and 3-4, Reed discloses a printed circuit board (50-figure 5, column 5, line 15) having a permanent solder mask as shown in figures 5-9 comprising:

a substrate (56, column 5, line 17) made of a material including a first resin having top and bottom surfaces,

first and second conductive patterns (52, 54, column 5, lines 15-16) disposed on said top and bottom surfaces and having an unsheltered portion (pad areas 52a, 54a, 72a, 74a, column 5, lines 22, 68, and patterns 86, 88) and a sheltered portion (the conductive patterns covered by a solder mask 90, see figure 9), said unsheltered portion having a base (52a, 54a, 72a, 74a) and a tip (86);

first and second solder masks (90-see figure 9, column 6, line 13) made of a second resin having a thermal expansion coefficient substantially identical to said first resin of said substrate (56) because they are made by the same dielectric material, see

column 3, lines 63-68, said first and second solder masks (90) coated on said top and bottom surfaces to form layers having first and second areas, said first area of each of said first and second solder masks (90) having a first thickness and a smooth outer surface and covering said sheltered portion, said second area having a second thickness less than said first area and surrounding said base, see figure 9 of said unsheltered portion such that said tip of said unsheltered portion exposed outside.

As to claim 5, Reed discloses said substrate (56) further comprises a plurality of conductive vias (60, column 5, line 18) therethrough by which said conductive patterns are electrically connected each other.

As to claim 7, Reed discloses the PCB as shown in figures 1-4 wherein an average thickness of said solder mask is between 2 um -200 um (column 4, lines 5-9).

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 2 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reed ('603) in view of Kardashian et al. (U.S. Patent 4,490,457).

Reed does not disclose the different between the highest portion and the lowest portion of the first solder mask equal to or less than 10um.

Kardashian shows a solder mask (12-figure 3) of a substrate (10) having the difference between the highest portion and the lowest portion of the first solder mask equal to or less than 10um (column 2, lines 32-68).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have taught's Kardashian to employ in the PCB of Reed for the purpose of providing a roughness surface for components (IC's) mounted on the PCB, the roughness surface can reduced strength when the components physical or electrical connected to the PCB.

As to claim 8, Reed does not disclose a micro-roughness of said outer surface between 0.5-10um. Kardashian shows a micro-roughness of said outer surface of said solder mask is between 0.5 u m -10 u m (column 2, lines 38-39).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a roughness surface of a solder mask between 0.5-10um as taught by Kardashian to employ the PCB of Reed for purpose of reduce strength and improve bonding of components mounted on the PCB.

8. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Reed ('603) in view of Chong et al. (U. S. Patent 5,699,613).

Reed does not disclose said conductive via has an interfill made of a material identical to that of said solder mask.

Chong shows a core substrate as shown in figures 2-7 comprising a viahole (16) filled with polymer (18) identical with material of solder mask (17).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have teaching's Chong to employ the PCB of Reed in order to easy to assembly and make electrical contact between components and the PCB.

***Conclusion***

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Maniwa et al. and Roberts et al. disclose related art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tuan T Dinh whose telephone number is 571-272-1929. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kammie Cuneo can be reached on 571-272-1957. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tuan Dinh  
June 16, 2004.

*D. Dinh, Jr.*  
David J. Zaneke  
Primary Examiner  
6/17/04